PRECISION ENGINEERING

Dell Precision workstations with AMD FirePro™ graphics can transform advanced design and engineering workflows using three or more displays

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PRECISION ENGINEERING

Dell Precision workstations are specifically designed to run demanding CAD/CAM/CAE and design viz software, offering performance & reliability

Dell Precision workstations are specifically made for engineering and design professionals, offering a powerful and reliable platform for advanced CAD/CAM/CAE software. All workstations are certified by the leading Independent Software Vendors (ISV) to ensure stability and performance under extreme compute intensive workloads.

Multi-core Intel Xeon processors support powerful processing and advanced multi-tasking. ECC (Error Correcting Code) memory provides increased reliability for compute intensive operations like simulation or rendering. In addition, Dell's exclusive, Reliable Memory Technology is able to map out bad areas that occur on a specific DIMM, eliminating virtually all memory errors.

AMD FirePro professional graphics delivers advanced 3D graphics performance to help manipulate huge CAD/CAM/CAE datasets smoothly on screen.

Optional PCIe Solid State Drives (SSDs) merge SSD technology directly with the fast PCIe system communication bus for very high-performance storage.

Dell Precision Performance Optimizer (DPPO) software, included with Dell Precision workstations, tunes system settings for individual CAD applications, including SolidWorks, Creo, CATIA & NX.

Dell offers a comprehensive range of desktop workstations. The Dell Precision T1700 is ideal for entry-level 3D CAD, while the T3610 raises the bar for mid-range and high-end users. For dual processor power the compact T5610 and scalable T7610 boost performance for simulation and rendering workflows.

The Dell Precision chassis is innovative, with the T7610 in particular featuring high levels of serviceability, such as hard drives that can be accessed from the front and a power supply that can be swapped out in seconds.

Dell Precision is not just for the office and Dell Precision mobile workstations deliver workstation-class hardware in a laptop chassis.

Dell Precision workstations come with a three year warranty with remote diagnosis and on-site service, which gives peace of mind during critical projects.

AMD FIREPRO PROFESSIONAL GPUs

AMD FirePro workstation-class Graphics Processing Units (GPUs) are available in all Dell Precision workstations — desktop and mobile. Designed specifically for users of professional CAD/CAM/CAE software, AMD FirePro GPUs are tuned to deliver optimized 3D performance and offer levels of reliability and image quality that cannot be matched by consumer GPUs.

To help ensure professional engineers and designers are working inside a stable and high performance workstation graphics environment, AMD works closely with all the major CAD/CAM/CAE Independent Software Vendors (ISVs).

The ISVs test and certify each AMD FirePro GPU model while AMD engineers carry out compliance, performance and functionality verification tests.

The new AMD FirePro W-Series — which includes the AMD FirePro W5000 (2GB GDDR5 memory), AMD FirePro W7000 (4GB GDDR5 memory), and AMD FirePro W8000 (4GB GDDR5 memory) — features AMD's Graphics Core Next (GCN) architecture. This new technology is designed to ensure GPUs make optimal use of their resources for maximum performance, which is particularly important when using features that improve image quality such as Full Scene Anti Aliasing.

AMD FirePro also features a multi-monitor technology called AMD Eyefinity, which enables a single GPU inside a Dell Precision workstation to drive up to four individual displays.

Beyond graphics, AMD FirePro W-Series GPUs are optimized for compute intensive operations such as simulation and rendering — tasks that are traditionally carried out by CPUs. With its 'GPU-compute' optimizations AMD FirePro not only offers performance benefits, but can free up the CPU for other tasks.

The AMD FirePro W5000 is available in the Dell Precision T1700, T3610, T5610 & T7610

AT A GLANCE DELL PRECISION SUITE

	Dell Precision T1700 MT Mini Tower configuration tuned for mainstream 3D CAD	Dell Precision T3610 Configuration tuned for 3D CAD with occasional simulation, design visualisation or CAM	Dell Precision T5610 Configuration tuned for users of simulation (CAE) software and high-end CAM	Dell Precision T7610 Configuration tuned for high-end users of design visualisation software
Operating System	Microsoft Windows 7 Professional 64-bit (Includes Windows 8 Pro license)	Microsoft Windows 7 Professional 64-bit (Includes Windows 8 Pro license)	Microsoft Windows 7 Professional 64-bit (Includes Windows 8 Pro license)	Microsoft Windows 7 Professional 64-bit (Includes Windows 8 Pro license)
Processor	Intel Core i7-4770 (quad core 3.40GHz, Turbo, 8MB cache)	Intel Xeon E5-1620 v2 (quad core, 3.7GHz, Turbo, 10MB cache)	Two Intel Xeon E5-2620 v2 (six core, 2.1GHz, Turbo 15MB cache)	Two Intel Xeon E5-2620 v2 (six core, 2.1GHz, Turbo 15MB cache)
Memory	8GB (4 x 2GB) 1,600MHz DDR3 ECC	16GB (4 x 4GB) 1,866MHz DDR3 ECC	16GB (4 x 4GB) 1,866MHz DDR3 ECC or 32GB (4 x 8GB) [1]	32GB (4 x 8GB) 1,866MHz DDR3 ECC
Graphics	AMD FirePro W5000 (2GB) (2 x DisplayPort & 1 DVI-I)	AMD FirePro W5000 (2GB) (2 x DisplayPort & 1 DVI-I) [2]	AMD FirePro W7000 (4GB) (4 x DisplayPort) [2]	AMD FirePro W7000 (4GB) (4 x DisplayPort) [2]
Storage	256GB 2.5-inch Solid State Drive (SDD) + 500GB 3.5-inch Serial ATA drive (7,200 RPM) [3]	256GB 2.5-inch Solid State Drive (SDD) + 1TB 3.5-inch Serial ATA drive (7,200 RPM) [3]	256GB 2.5-inch Solid State Drive (SDD) + 1TB 3.5-inch Serial ATA drive (7,200 RPM) [3]	256GB 2.5-inch Solid State Drive (SDD) + 2TB 3.5-inch Serial ATA drive (7,200 RPM) [3]
Chipset	Intel C226	Intel C602	Intel C602	Intel C602
Size (HxWxD)	14.17" x 6.89" x 17.13"	16.30" x 6.79" x 18.54"	16.30" x 6.79" x 18.54"	16.95" x 8.50" x 20.67"

1 For multi-application workflows and larger datasets. 2 AMD FirePro V4900, W5000, or W7000 all available. 3 Full range of SATA, SAS or SSD drives also available with RAID 0/1/5/10.

GOING MOBILE DELL PRECISION ON THE GO

Workstation-class performance and reliability don't end on the desktop. Dell also offers two mobile workstations — the Dell Precision M4800 and M6800 — with a choice of 15.6-inch and 17.3-inch Dell UltraSharp displays.

Dell Precision mobile workstations feature fourth generation Core i5 and i7 processors and capacity for up to 32GB memory. They also share the same keyboard with number pad, removable hard drive bays and batteries.

Both machines feature AMD FirePro graphics with AMD Eyefinity technology and support up to four external displays. The Dell Precision M4800 offers the AMD FirePro M5100 Mobility Pro with 2GB GDDR5, while the Dell Precision M6800 boasts the more powerful AMD FirePro M6100 Mobility Pro Graphics with 2GB GDDR5.

Both systems have options for multiple storage devices enabling RAID and the benefits that RAID brings.

Image courtesy of Jamie Klopp, Atmos Group and Luxon

THE DELL PRECISION CHASSIS

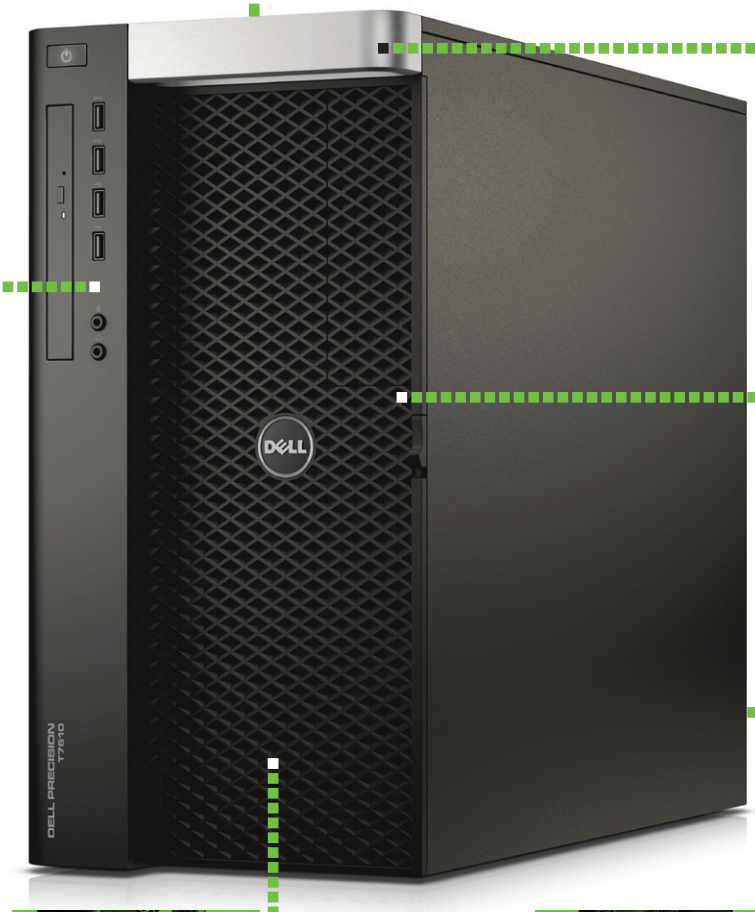
Dell Precision workstations boast a stylish chassis with impressive accessibility. The Precision T7610 shows off the very best of the features.

RECESSED TRAY

The recessed tray on the top of the machine helps stop peripherals, such as USB hard drives, sliding off.

EASY ACCESS

Four, widely spaced, USB ports are included for easy access. The DVD drive is rotated 90 degrees to make space for up to eight front loading hard drives.



INTEGRATED HANDLES

The light aluminum handles (front and rear) are an integral part of the chassis and incredibly strong

FRONT GRILL

The lockable front grill has two main functions: it secures the interior components and enables air to flow straight through the machine to keep it running cool. The extruded diamond pattern also gives the workstation a clear identity.

EASY ACCESS HARD DRIVES

The Precision T7610 can house up to eight hard drives, all of which are accessible from the front of the machine behind the removable front grill. The drives can be clipped in and out in seconds, making them incredibly easy to replace or store overnight in a safe if data is highly confidential.

REMOVEABLE POWER SUPPLY

The power supply unit (PSU) can be pulled out directly from the back of the machine, allowing defective units to be replaced in seconds. A built in frosted plastic handle glows green when functioning correctly and changes colour if there is a failure, making it easy to diagnose a power problem.

THE IMPORTANCE OF CERTIFICATION

Professional designers and engineers demand a stable, reliable platform to run CAD/CAM/CAE software. That's why Dell Precision workstations are rigorously tested and certified by Independent Software Vendors (ISVs). Certification provides assurance that specific combinations of hardware and software meet key requirements to deliver a high-performance, reliable workstation.

For certification Dell typically provides ISVs with workstations to test. ISVs have in-depth knowledge of their applications so are best placed to check specific features. If any issues are found, these are then fed back to Dell, who will then work closely with the ISV for a solution. If the issue relates to AMD FirePro graphics, AMD also plays a key role, making changes to the graphics driver if appropriate. It's a collaborative process.

The most significant part of certification involves testing with professional graphics. This is one of the most complex aspects of any 3D software as it needs to work with graphics cards from multiple vendors. Testing typically includes loading and spinning a model and running through different viewing states – such as wireframe, shaded or rendered – to check it displays correctly. Geometry is often modified to see if the model updates correctly.

On-going support is a key benefit of buying a certified workstation. Certified configurations will be supported by all parties, so if any problems arise then Dell, AMD and the ISV will do their best to resolve them. Technically speaking, if a customer buys a non-certified PC all parties are not fully responsible for support.

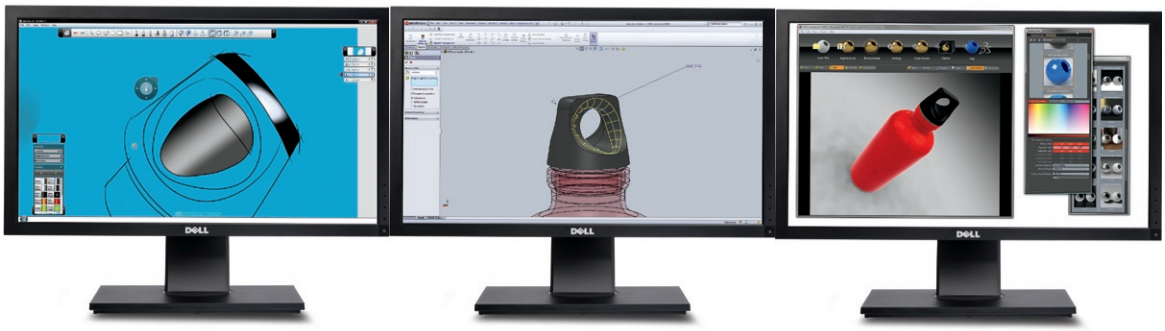
Software support is best handled by specialists so Dell often helps ISVs by leaving a workstation with them post certification. This helps ISVs reproduce customer problems promptly so all parties can then work towards a fix quicker. This type of customer feedback is essential to help Dell continue to develop high-performance, reliable workstations.

THE MULTI-MONITOR REVOLUTION

AMD Eyefinity enables three or more displays to be run off a single graphics card. Here are some typical workflows supported by Dell Precision workstations with AMD FirePro professional graphics.

FOR CAD (DESIGN VIZ)

During the conceptual design phase product designers typically use a number of different applications, from dedicated sketching tools to 3D rendering software. Having all these applications at your fingertips can streamline the process as data moves between them.



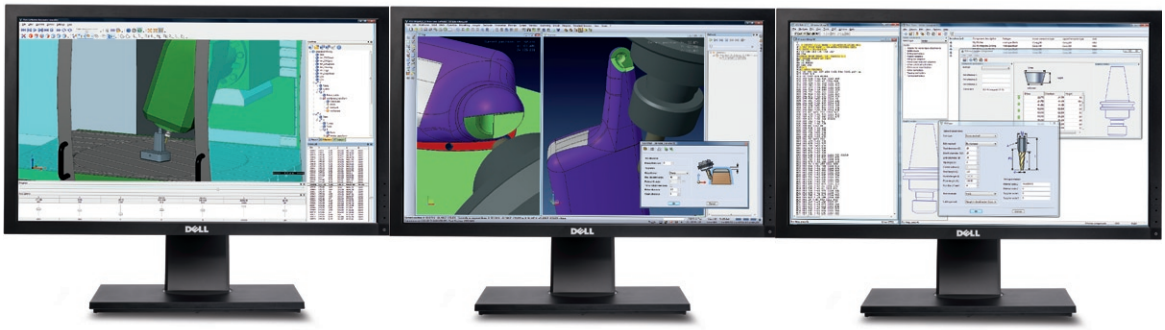
1 Conceptual design of a water bottle using Autodesk Alias Sketch

2 Building up a solid model of the water bottle inside SolidWorks

3 Rendering and material tweaking inside PhotoView 360

FOR CAM (MACHINING)

CAM operators typically have a number of tasks running in parallel. VISI Machining, like many other CAM applications, allows the toolpath calculation to run on separate processors, therefore freeing the operator to set up and calculate further toolpaths without a performance penalty.



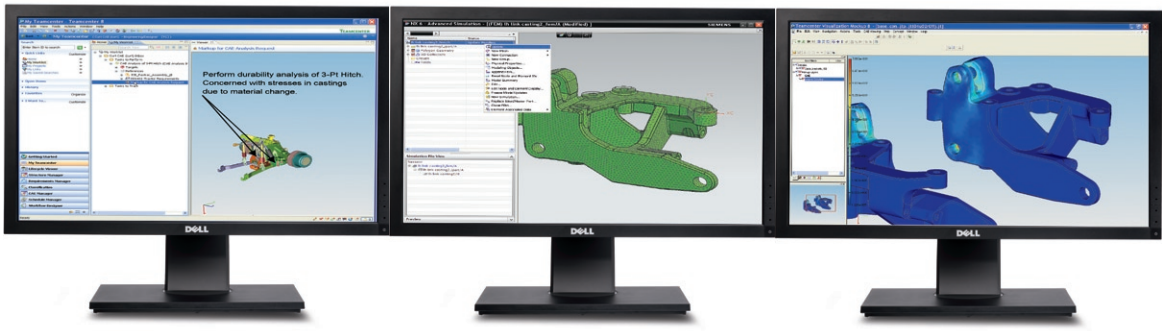
1 Simulation of the programme prior to running, to check against physical machine limits

2 Setting up machining parameters for a 5-axis milling program

3 Updating the tooling carousel / library and validating the NC code in the CAM database

FOR CAE (SIMULATION)

An engineer's workflow when using CAE applications like Siemens PLM Software's NX Simulation typically revolves around model preparation and results visualization. The whole process is managed from inception to completion, in this case using Teamcenter.



1 Simulation tasks are assigned and managed inside Teamcenter

2 CAE models are prepared using NX and simulations are executed

3 Simulation results are visually verified using Teamcenter Lifecycle Visualization

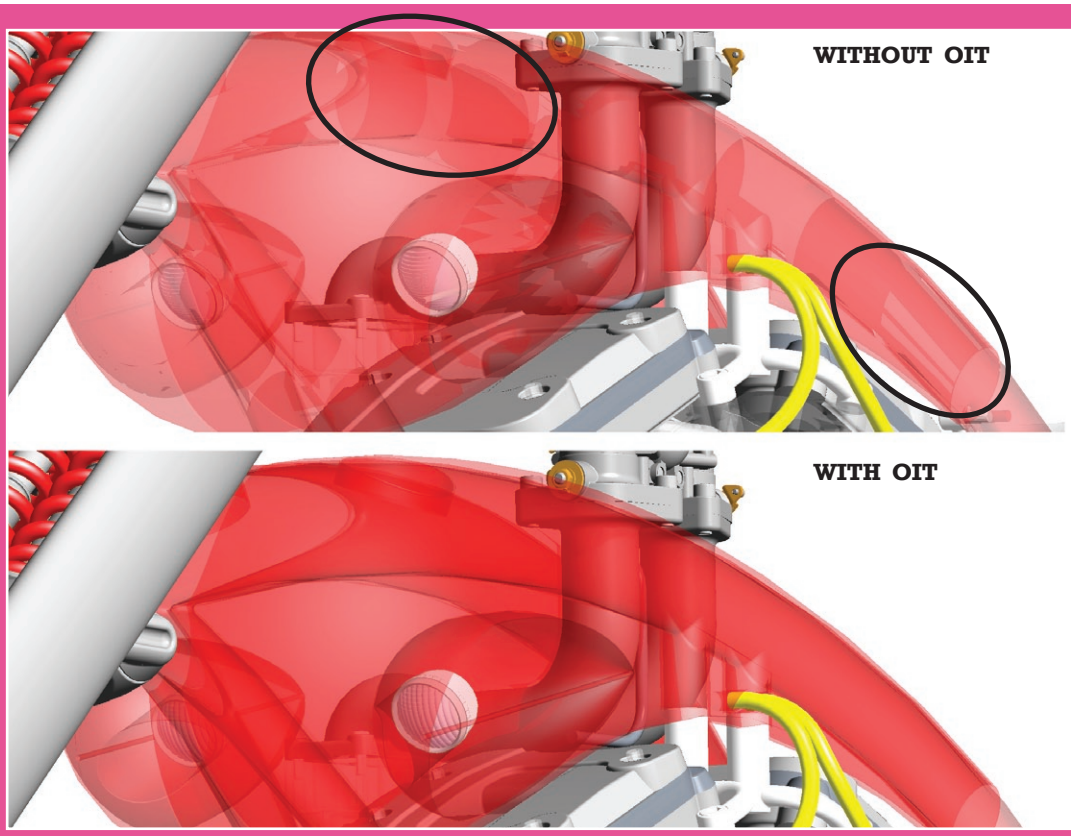
AMD EYEFINITY

AMD Eyefinity is a specialist multi-monitor graphics technology. It enables a Dell Precision workstation with a single AMD FirePro graphics card to drive up to four individual displays. Monitors can sit side by side on a desk or be arranged in a 2 x 2 array to create a massive visual workspace.

The AMD FirePro W5000 enables three monitors to be grouped side-by-side, giving 3D professionals access to a much bigger design canvas. Three monitors can also aid advanced engineering workflows, where users switch between applications or datasets within a project. Key tasks include conceptual design, part and assembly modeling, drawing production, rendering, simulation and data management, not forgetting email, spreadsheets and Web browsing. Having all relevant project data displayed on screen offers huge productivity benefits as time is not wasted 'Alt / Tabbing' between applications.

Moving up a level, a single AMD FirePro W7000 and AMD FirePro W8000 can support four displays. These can be grouped in a 2 x 2 array to create a powerwall with a 3D model spread across all screens. This can be used for presentations, design / review or digital mockup. For even larger scale visualization, the AMD FirePro W7000 and AMD FirePro W8000 can also drive a 4k projector, where product styling and form and fit can be assessed and refined.

WORKSTATIONS FOR CAD



GPU-ACCELERATED TRANSPARENCY IN PTC CREO 2.0

Creo Parametric 2.0 features a new real-time GPU-accelerated transparency mode — Order Independent Transparency (OIT) — that is uniquely supported by AMD FirePro professional GPUs. Compared to older methods for rendering transparency in the viewport, OIT renders the model a lot more accurately.

OIT fixes a problem that occurs with older "blended transparency" methods that can cause visual artifacts, making it harder to perceive depth.

Transparency is particularly useful for revealing details inside complex models or rendering semi transparent materials like glass or plastic.

Computer Aided Design (CAD) software plays a key role in modern product development workflows. It is used to create intelligent 3D mechanical design models, which can then be used downstream for drawings, simulation, manufacturing or design visualization.

Key applications include Autodesk Inventor, Dassault Systèmes (DS) CATIA, DS SolidWorks, PTC Creo, Siemens PLM Software NX and Solid Edge.

Workstation

The Dell Precision T1700 is well suited to entry-level 3D CAD, with the T3610 offering more for high-end CAD with better options for CPU, graphics and storage.

Processor (CPU)

As a lot of CAD software is single threaded — i.e. it can only make use of one core in a multi core processor — it is generally more important to have a high GHz CPU than one with lots of CPU cores. There are exceptions, however, and certain elements of CAD software can be multi-threaded. The process of opening models or creating drawings, for example, is often accelerated by multi-core CPUs. Rendering, an important part of design visualization, makes full use of multi-core CPUs.

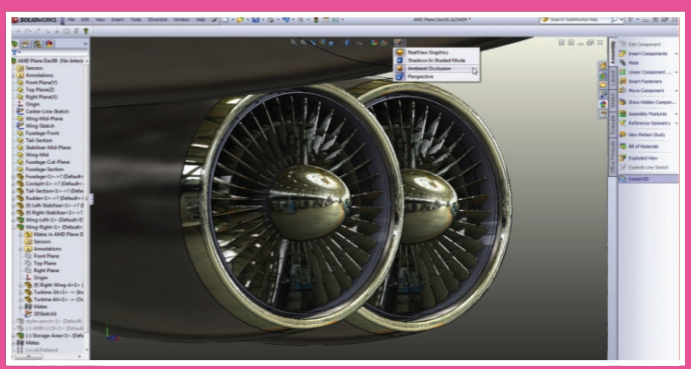
Graphics card (GPUs)

Professional GPUs enable 3D CAD models to be manipulated smoothly on screen. A mid-range GPU, such as the AMD FirePro W5000, is a good fit for most CAD workflows. All applications are different though and DS CATIA, for example, benefits more from a higher-end GPU, like the AMD FirePro W7000. On-board GPU memory can also be important and 2GB gives plenty of capacity to load 3D models, which can improve overall performance.

With FirePro W-Series GPUs, high-quality features like Full-Scene Anti-Aliasing can be turned on permanently without slowing down frame rates. FSAA removes coarse edges from contours of geometries in real time, resulting in higher-quality visuals and a more accurate representation of designs.

Modern CAD applications support advanced real time shading to help bring models to life. In SolidWorks, for example, RealView with Ambient Occlusion (pictured below) delivers outstanding depth and realism reducing the need for ray-traced rendering. AMD FirePro is specifically optimized for this, offering high levels of real-time performance.

AMD Eyefinity technology, at the heart of the FirePro W5000, enables three displays to be run from a single graphics card. This can lead to big productivity benefits for those swapping between multiple applications, datasets or parts and assemblies.



Memory (RAM)

Large assembly modeling and multi-application workflows can put a big load on memory. If memory limits are hit, performance can seriously slow down. 8GB is a good entry-level for 3D CAD, with anything up to 24GB for high-end users. A 64-bit Operating System is essential.

WORKSTATIONS FOR CAE

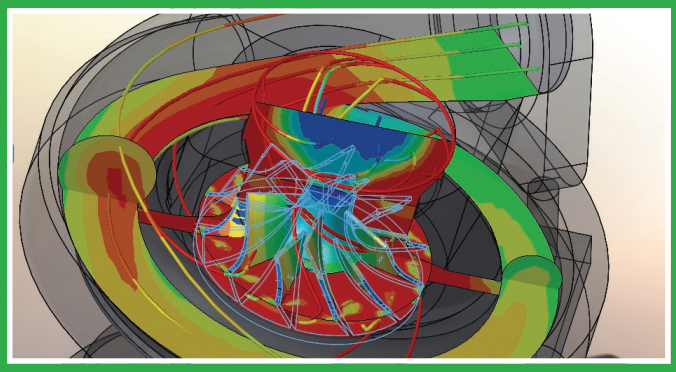


Image courtesy of SolidWorks

Computer Aided Engineering (CAE) or simulation software includes a wide range of tools to help engineers predict the performance of products. Primary software comprises Finite Element Analysis (FEA) for stress analysis, Computational Fluid Dynamics (CFD) for thermal and fluid flow analysis, and kinematics. Key software developers include Ansys, Autodesk, Dassault Systèmes Simulia, CD-adapco, MSC Software, PTC and Siemens.

Workstation

The compact dual processor Dell Precision T5610 is well suited to CAE. For ultimate performance, with enough memory to handle the biggest datasets, the Dell Precision T7610 is a better fit.

Processor (CPU)

Most CAE software is multi-threaded. i.e. simulations can be solved quicker with multi-core processors. However, a lot of CAE software offers diminishing returns above two or three CPU cores, with a cluster needed to truly accelerate solve times. Dual processor workstations can offer improved performance though and also the ability to multi task. For example, an engineer can run multiple 'what-if' simulations concurrently to help find more optimal solutions.

Graphics card (GPUs)

Graphics requirements vary from application to application. A mid-range card, like the FirePro W5000, will be a good fit for a lot of CAE software, but some applications, including CEI Ensight and MSC Patran, can make use of more high-end cards such as the FirePro W7000 or W8000. AMD Eyefinity technology can run three or more displays from a single card. This can lead to big productivity benefits as new jobs can be prepared while others are monitored. Results can also be compared side by side.

The rise of the OpenCL compute language also means GPUs can now be used alongside CPUs to reduce the solve times of simulations. The OpenCL-compliant version of Abaqus from DS Simulia, for example, can take advantage of GPUs for structural and multiphysics analysis.

The AMD FirePro W8000 is particularly suited to CAE due to its high rating for double-precision performance.

Memory (RAM)

Simulations can take up lots of memory, so 16GB of ECC RAM is common, with anything up to 192GB for extremely complex problems. A 64-bit Operating System, such as Microsoft Windows 7 64-Bit, is essential.

WORKSTATIONS FOR VIZ

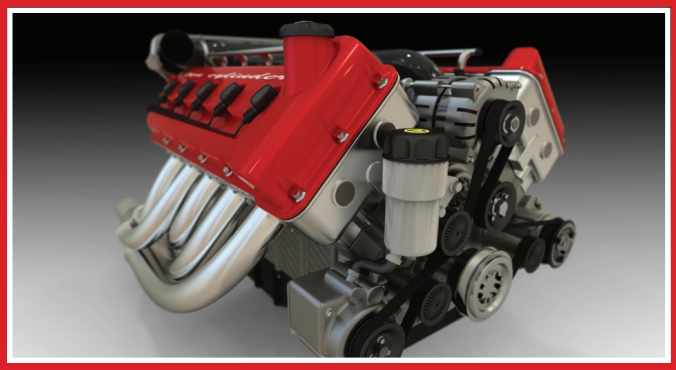


Image courtesy of jreis and Luxion

Design visualization software is used to create photorealistic renderings or animations of designs. To achieve this, the majority of applications use 'ray tracing', a computationally intensive technique that traces paths of light and simulates how they interact with virtual objects. Key software includes Autodesk 3ds Max Design, Bunkspeed Shot, Luxion Keyshot, Luxology Modo, Maxon Cinema 4D, NewTek LightWave and RTT DeltaGen. Most CAD software also includes built-in photorealistic rendering technology.

Workstation

A dual processor workstation, such as the compact Dell Precision T5610 is well suited to entry-level design visualization. For ultimate performance the T7610 is a good match, with expanded options for memory and high-performance RAID hard drive setups.

Processor (CPU)

All rendering software is multi-threaded and can be accelerated by multiple CPU cores. In fact, as a rule of thumb, doubling the number of CPU cores halves the rendering time. This makes a dual processor system, with eight cores per CPU, an excellent choice for those looking to seriously accelerate render times.

Graphics card (GPU)

Most design visualization software can make good use of high-end graphics, making the AMD FirePro W7000 or AMD FirePro W8000 good options. Graphics memory is also important so large textures can be loaded. Here, 2GB or 4GB is a good amount.

AMD Eyefinity technology, at the heart of the FirePro W-Series, means up to four displays can be powered by a single graphics card. This can be used to boost productivity in design viz workflows. For example, the digital artist can use the centre display for scene preparation, with two flanking displays used for CAD modeling or to host toolbars, texture libraries, or test renders. Alternatively, a single high-resolution 2 x 2 array powerwall can be made up of four individual displays for stunning presentations.

Memory (RAM)

Design visualization software can use up a lot of memory with geometry and texture maps both contributing to the load. 16GB of ECC memory is typical, with much more needed for complex datasets. A 64-bit OS, such as Microsoft Windows 7 64-Bit, is essential.

DELL ULTRASHARP WITH AMD EYEFINITY

With outstanding visual quality Dell UltraSharp is the perfect partner for Dell Precision workstations with AMD Eyefinity multi-monitor technology

Dell UltraSharp monitors are specifically designed for CAD/CAM/CAE professionals who demand high-precision displays. Featuring the very latest high-resolution IPS (Image Plane Switching) technology, they are able to display high-clarity CAD line drawings and vivid 3D renderings with exceptional color accuracy and richness. Excellent response time reduces ghosting and blur and enables the smooth manipulation of 3D CAD models on screen.

Dell UltraSharp monitors are available in a range of screen sizes, resolution and professional features to suit all budgets and requirements. Models start at 21.5-inch 1,920 x 1,080 (Full HD) right up to 32-inch 3,840 x 2,160 (Ultra HD) resolution.

AMD Eyefinity

Dell UltraSharp displays are the perfect partners for AMD's multi-monitor Eyefinity technology. With full tilt, swivel and pivot control they can be adjusted to fit any desktop environment. With VESA support they can also be mounted on stands or walls.

When partnering Dell UltraSharp monitors with AMD Eyefinity, there are a few important considerations. In grouped mode, where three monitors create one extended desktop, the ideal scenario is to use three identical monitors or, failing that, three monitors with the same size, resolution and dot pitch. This helps ensure 3D models, windows or dialogue boxes do not suffer from a stepping effect when stretched across screens or moved from one display to another. Using identical screens also makes color reproduction more consistent when a single image is stretched across multiple displays. This is even more important for presentations or styling on 2 x 2 powerwalls. Using identical monitors is less important when dedicating individual displays for individual applications.

VSI screen shot courtesy of Vero

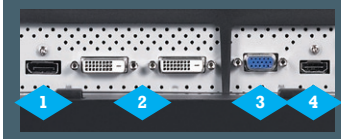
AMD Eyefinity also supports portrait monitors. Pivot mode is available on Dell UltraSharp displays up to 24-inch in size

CONNECTIVITY

With AMD Eyefinity multi-display technology it is important to match displays with the available outputs on the AMD FirePro graphics card.

The AMD FirePro W7000 and AMD FirePro W8000, for example, feature four DisplayPort outputs. This makes them fully compatible with all current Dell UltraSharp monitors. To use older displays that support DVI or VGA but not DisplayPort, a DisplayPort to DVI or DisplayPort to VGA adapter is required.

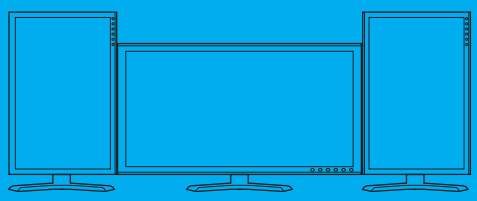
The AMD FirePro W5000 features two DisplayPorts and one DVI output, so to support three displays you need to make sure they have the appropriate ports.



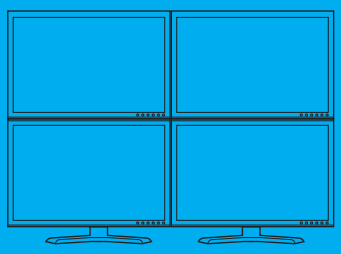
Common connectivity options
1 DisplayPort 2 DVI (Digital Visual Interface) 3 VGA 4 HDMI (High-def Multimedia Interface)

FLEXIBILITY WITH AMD EYEFINITY

1 Three Dell UltraSharp: landscape (3 x 1)
One extended desktop up to 7,680 x 1,600 resolution. Supported on AMD FirePro V4900 or W5000 and above.



2 Three Dell UltraSharp: landscape & portrait (3 x 1)
One hi-res 2,560 x 1,600 resolution display flanked by two portrait monitors of any resolution. Supported on AMD FirePro V4900 or W5000 and above.



3 Four Dell UltraSharp array (2 x 2)
A powerwall for design/review up to 7,680 x 4,320 resolution. Supported on AMD FirePro W7000 and above.

CONTACT

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